

ECONOMICS 207
FALL 2006
PROBLEM SET 8

Problem 1. Consider the following matrix and vectors.

$$A = \begin{bmatrix} 1 & -\frac{1}{3} & 2 \\ 3 & 0 & 6 \\ 5 & -\frac{5}{3} & 11 \end{bmatrix}$$

$$c = \begin{bmatrix} 2 \\ 9 \\ 11 \end{bmatrix}$$

(i) Find the inverse of the matrix A.

(ii) Find the solution vector $x = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$ to the system $Ax = c$ by using Cramer's Rule.

Problem 2. For the following problem, find the critical points. For each critical point state whether the function is at a relative maximum, relative minimum, or otherwise. Check to see if there are points of inflection **at points other than** critical points.

(i) $f(x) = \frac{1}{3}x^3 + \frac{3}{2}x^2 - 28x + 5$

Problem 3. Find all first partial derivatives of each of the following

(i) $y = -x_1^2 e^{5x_2} + 3x_1$

(ii) $y = x_1 e^{-x_1^2 x_2^2}$

(iii) $y = x_1^3 x_2^3 \ln(x_2)$

(iv) $y = x_1^7 \cdot \ln(x_2) + \frac{9}{x_1^3} - \sqrt{x_2}$